Calculus Warm Up # 7- 4

Test day, no warm up.

Turn it in.

Back into Chapter 7 starting Monday.

Exponential and Logarithmic Functions

7.2 Integration of Exponential Functions

Integration Rules

Let u be a differentiable function of x.

1. $\int e^x\,dx = e^x + C$ 2. $\int e^u\,du = e^u + C$

$$\int e^{3x+1}\,dx$$

Let $u = 3x+1$

$du = 3\,dx$

$$= \frac{1}{3}\int 3e^{3x+1}\,dx$$

$$= \frac{1}{3}\int e^u\,du \rightarrow = \boxed{\frac{1}{3}e^{3x+1} + C}$$

Evaluate:

1. $\int 5xe^{-x^2}\,dx$

$u = -x^2$

$du = -2x\,dx$

$$-\frac{5}{2}\int -2xe^{-x^2}\,dx$$

$$= -\frac{5}{2}\int e^u\,du$$

$$= \boxed{-\frac{5}{2}e^{-x^2} + C}$$

2. $\int \frac{e^{1/x}}{x^2}\,dx$

$u = \frac{1}{x}$

$du = -\frac{1}{x^2}dx$

$$-\int e^u\,du$$

$$\boxed{-e^{1/x} + C}$$

3. $\int (1 + e^x)^2 dx$

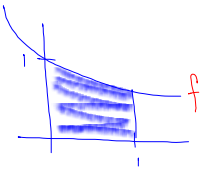
Rewrite:

$= \int (1 + 2e^x + e^{2x}) dx$

$= \int 1\,dx + 2\int e^x dx + \frac{1}{2}\int 2e^{2x} dx$

$= x + 2e^x + \frac{1}{2}e^{2x} + C$

4. Find the area of the region bounded by $f(x) = e^{-x}$ and the x-axis on [0, 1].



$A = -\int_0^1 -e^{-x} dx$ $\quad u = -x$, $du = -dx$

$= -\left[e^{-x}\right]_0^1$

$= -\left(\frac{1}{e} - e^0\right)$

$= \boxed{-\frac{1}{e} + 1}$

HW: From 7.2,

Read: p. 366 - 369,

Do: p. 370 # 43 - 69 odd